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Specification and Drawings, as originally filed, with Application for Patent Serial
No: **CA 2423034**, on March 21, 2003, by **FANOTECH ENVIRO INC.**, assignee of
Gabe Tomassoni, for "Multiple Compartment Waste Collection Vehicle".

L. Lachance
Agent certificateur/Certifying Officer

July 18, 2006

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ABSTRACT

The present invention relates to a container for use in association with a transport vehicle, for collecting and transporting different kinds of waste. Accordingly, the invention herein comprises a refuse collection system for use in combination with a transport vehicle. The system comprises a housing having a waste collection container and a tailgate whereby the tailgate has a front wall with an opening to the waste collection container. The tailgate has a hopper with multiple compartments for receiving waste. A packing mechanism is suspended within the tailgate and the packing mechanism has multiple packer blades and a single shield for displacing refuse from the compartments of the hopper through the opening to the waste collection container.

TITLE OF THE INVENTION**MULTIPLE COMPARTMENT
WASTE COLLECTION CONTAINER**

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FIELD OF THE INVENTION

The present invention relates to a container for use in association with a transport vehicle, for collecting and transporting different kinds of waste.

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BACKGROUND OF THE INVENTION

Rear loading refuse vehicles are well known. Generally, such vehicles employ a hopper, integral to the tailgate, into which waste is deposited. The waste is then transferred into a compartment in the vehicle body and is compressed to economize on space. The vehicles as described in some patents, such as U.S. Patent Nos. 3,746,192, 3,777,917 and 4,029,224 (each of Herpich et al.), and U.S. Patent No. 6,234,739 (Smith et al.), have improved upon the efficiency and durability of packing mechanisms by altering the placement of the hydraulic cylinders that mobilize the packing blade. Other improvements to rear loading refuse vehicles include positioning of the packing blade to avoid obstruction of the refuse deposited in the hopper, as in U.S. Patent No. 4,460,307 (Durant et al.) and improved safety features such as those disclosed in U.S. Patent No. 4,065,008 (Ratlledge).

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It is also well known to separate the refuse storage area into multiple compartments to separate different waste materials. For example, each of U.S. Patent No. 4,242,953 (St. Gelais), U.S. Patent No. 4,113,125 (Schiller) and U.S. Patent No. 5,123,801 (O'Daniel) disclose refuse vehicles with more than one compartment, where such compartments are vertically aligned. St. Gelais' truck has two compartments, one of which is served by a scraper blade, the other of which is packed by a press panel or ram. Schiller's refuse collecting system contemplates a separate feed or loading shovel for each

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separate chamber. Finally, O'Daniel's vehicle employs multiple scraper blades that empty the multiple buckets that receive refuse.

Multiple compartments may also be divided horizontally. United States Patent No. 5,885,049 (McNeilus et al.) depicts a multiple compartment refuse vehicle in which one compartment is above the second compartment. The hopper has a lower and upper portion each of which is served by a separate packing mechanism.

Vehicles that employ multiple compartments for storing refuse have some limitations. For example, the viability of such vehicles is contingent upon the waste collection programmes and methods of public authorities. Different jurisdictions may have different waste separation and collection regimes so that a multi-compartmented vehicle may be suitable for one jurisdiction but not for its neighbour.

Furthermore, the use of multiple means for sweeping refuse with multiple tailgates from the hopper presents numerous disadvantages. First, where there are multiple tailgates and packing mechanisms, it is necessary to employ multiple power sources and components to operate those mechanisms. This increases the mass of the vehicle and thus diminishes its fuel efficiency. It also causes imbalance, since the packing components are located behind the rear wheels of the vehicle. Furthermore, the addition of more packers necessitates more frequent maintenance and thus makes the vehicle more expensive to operate. Finally, the individual packing mechanisms have less compaction capacity when there are multiple compacting means. Multiple packers are less efficient and thus the vehicles have less compaction capacity than traditional refuse transporting vehicles, known as "single stream" vehicles. As a result, such vehicles haul less trash than single stream vehicles with vehicle bodies having identical volumes.

Finally, the failure of prior art refuse vehicles to separate types of refuse leads to other deficiencies. For example, as the compostable waste is compacted, it loses its water, thus creating liquid waste. This waste frequently escapes the refuse vehicle and presents an environmental hazard.

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SUMMARY OF THE INVENTION

An object of the invention is to provide a vehicle that compacts different classes of waste separately.

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A further object of the invention is to provide a vehicle that has multiple compartments for storing different types of waste.

A further object of the invention is to provide a vehicle that packs waste into separate compartments by use of a single tailgate and packing mechanism.

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A further object of the invention is to provide a vehicle that packs different types of waste into separate compartments while minimizing the mass of the vehicle.

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A further object of the invention is to provide a vehicle that packs different types of waste into separate compartments while maintaining the compaction capacity of a single compartment refuse vehicle.

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A further object of the invention is to provide a vehicle that can be easily converted to a multi-compartment refuse vehicle from a single stream vehicle that does not separate different types of waste.

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A further object of the invention is to provide a vehicle that retains liquid waste and stores that waste within a sump area.

The waste collection system of the present invention comprises a housing having a waste collection container and a tailgate. The tailgate has a front wall with an opening into the waste collection container and a hopper with multiple compartments for receiving waste. A packing mechanism is
5 suspended within the tailgate and has multiple packer blades and a single shield for displacing refuse from the compartments of the hopper through the opening to the waste collection container.

BRIEF DESCRIPTION OF THE DRAWINGS

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In drawings which illustrate by way of example only a preferred embodiment of the invention:

Figure 1 is a side plan view of the waste collection container with the
15 tailgate in a closed position;

Figure 2 is a rear view of the waste collection container from which the tailgate has been detached;

20 Figure 3 is a side plan view of a detached tailgate with the packing mechanism in a position above the hopper;

Figure 4 is a side plan view of a detached tailgate with the packing mechanism in a position within the hopper; and

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Figure 5 is a front plan view of the packer blades.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

30 A container for collecting and transporting different types of waste 5 is shown in Figure 1. Preferably, the container 5 is attached to a chassis of a waste collection vehicle. The container 5 has a top 7, a floor 9, a front wall 11

and side walls 13 and 15. A tailgate 17 is attached to the container 5 at a pivot attachment 19. Thus the container and tailgate combine to form housing 21. Container 5 has multiple compartments for storing waste.

5 A ram 23 is located within the container 5. The ram 23 is attached by a telescopic extension 25 to the front wall 11 of the container 5. The telescopic extension 25 may be attached near the bottom of the front wall 11 or near the top of the front wall 11. Tracks 27 extend along the length of the container. In a preferred embodiment, the ram 23 has multiple faces to
10 accommodate each compartment for storing waste. Each face of the ram 23 disposes of waste from a separate compartment of the container 5.

 In a preferred embodiment, the floor 9 beneath one of the compartments is perforated such that the compartment is in communication
15 with a channel 29. Channel 29 is also in communication with a sump 31. Sump 31 is attached to the container 5 and is also in communication with channel 29. A drain 33 is attached to the sump 31.

 A preferred embodiment of the multiple compartments for storing
20 waste is shown in Figure 2. A divider 35 is attached to the floor 9 of the container 5. A ceiling 37 is attached to the divider 35 and the side wall 13. Thus, a tunnel 39 is defined by the floor 9, the divider 35, the ceiling 37 and the side wall 13. The tunnel 39 may be specially adapted to receive compostable waste. Specifically, the divider 35, the ceiling 37 and the side
25 wall 13 are preferably sealed so as to prevent moisture from the compostable waste from leaking from the tunnel. Furthermore, in a preferred embodiment, floor 9 is perforated. In a further embodiment not shown in the diagrams, swing 41 is pivotably attached to ceiling 37 to contain liquid waste when the tailgate 17 is open.

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 In a preferred embodiment of the container 5, the divider 35 and the ceiling 37 are removably attachable to the floor 9 and the side wall 13 of the

container 5. When removed, the container 5 is operable as a single stream refuse vehicle such that waste is not separated within the container 5. Furthermore, that the divider 35 and the ceiling 37 may be attached to a single stream refuse container to convert it into a multiple compartment refuse container.

The tailgate 17 has a front wall 43, a top 45, side walls 47 and 49 and a back wall 51, as shown in Figure 3 and Figure 4. Front wall 41 has an opening 53. Attached to the front wall 43 of the tailgate 17, and defining a floor of tailgate 17, is a hopper 55. Preferably, the hopper 55 is divided into separate compartments by a slot 57.

A packing mechanism 59 is suspended within tailgate 17. The packing mechanism 59 includes packer blades 61 and 63. The packing mechanism 59 is also comprised of a shield 65, which is attached to a fin 67. A first hydraulic cylinder 69 is pivotably attached near the top of the packer blades 61 and 63 while a second hydraulic cylinder 71 is pivotably attached near the base of the packer blades 61 and 63. At a second end, the first hydraulic cylinder 69 is pivotably attached near the top 43 of the tailgate 17. A second end of hydraulic cylinder 71 is pivotably attached near the back wall 49 of the tailgate 17.

The shield 65 is pivotably attached to the tailgate 17 at a bottom end of the shield 65 by an arm 73. The arm 73 is pivotably attached near the back wall 51 of the tailgate 17. The shield 65 is pivotably attached to the tailgate 17 at a top end of the shield 65 by a guide 75. The guide 75 is pivotably attached at its top end near the intersection of the top 45 and the back wall 51 of the tailgate 17.

As seen in Figure 5, in a preferred embodiment, the packer blade 61 is attached to first cylinders 77 and 79 while the packer blade 63 is attached to a second cylinder 81.

When the container is in operation, waste that has been deposited into the hopper 55 is moved to the container 5 by the packing mechanism 59. The packing mechanism 59 has four primary positions through which it cycles within tailgate 17. The positions of the packer blades 61 and 63 are controlled by the first hydraulic cylinder 69 and second hydraulic cylinder 71. First hydraulic cylinder 69 governs the vertical position of the packer blades 61 and 63, while second hydraulic cylinder rotates the packing blades 61 and 63. The position of the shield 65, and thus the fin 67, is governed by the movement of the arm 73 and the guide 75.

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In the first position of the packing mechanism 59, shown in Figure 3, the packer blades 61 and 63 are positioned near the opening 53 in the back wall 51 of the tailgate 17. The first hydraulic cylinder 69 is fully retracted and the second hydraulic cylinder 71 is fully extended. Preferably the packing mechanism 59 is in the first position when waste is added to the hopper 55.

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In the second position of the packing mechanism 59, the second hydraulic cylinder 71 is retracted so as to rotate the packer blades 61 and 63 away from the front wall 43 of the tailgate 17. This will provide some clearance between the packer blades 61 and 63 and waste within the hopper 55 as the packer blades 61 and 63 are displaced toward the third position. The second hydraulic cylinders 71, the arm 73, the guide 75 do not in the transition from first position to second position. If retraction of the second hydraulic cylinder 71 occurs when the first hydraulic cylinder 69 is not in a fully retracted position, waste may be forced from the hopper 55 outside of the tailgate 17 as the packing mechanism 59 moves toward the third position.

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In each of the first and the second position of the packing mechanism 59, the shield 65 and the fin 67 are orientated above the hopper 55.

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In the third position, shown in Figure 4, the packing mechanism 59 is positioned near the back wall 51 of the tailgate 17 and is above the waste

within the hopper 55. The first hydraulic cylinder 69 is fully extended, while the second hydraulic cylinder 71 is fully retracted. The arm 73 and the guide 75 have moved the shield 65 and the fin 67 into the hopper 55. The fin 67 extends above the compartments within the hopper 55 to prevent the mixing
5 of refuse from the compartments of the hopper 55.

In the fourth position of the packing mechanism 47, also shown in Figure 4, the packer blades 61 and 63 have engaged the refuse within hopper 55. The packer blades 61 and 63 have rotated into the hopper 55 as the
10 second hydraulic cylinder 71 has extended. Retraction of the first hydraulic cylinder 69 returns the packer blades 61 and 63 to their first position and sweeps refuse from the hopper 55 toward the opening 53 in the front wall 43 of the tailgate 17. The shield 65 and the fin 67 have moved in conjunction with the packer blades 61 and 63 to ensure the continued separation of
15 waste from separate compartments. The refuse is ultimately deposited by the packer blades 61 and 63 through the opening 53 into the container 5.

In a preferred embodiment, the packer blades 61 and 63 may be rotated through the hopper 55 in tandem or at differing rates to account for
20 the varying volumes and resilience of refuse within the separate compartments of the hopper 55.

After many cycles of the packing mechanism 59 through position one to position four within the tailgate 17, it will be necessary to expel waste from
25 the container 5. The tailgate 17 may be opened and closed by hydraulic means. The tailgate 17 pivots about the pivot attachment 19 upward and away from container 5 and may be locked in the open position.

When the container 5 is empty, the ram 23 is located at or near the
30 front wall 11 of the container 5. In operation, the ram 23 moves upon the tracks 27 in response to force exerted by the telescopic extension 25. The telescopic extension 25 preferably extends the ram 23 to the back portion of

the container so that all refuse in the path of the ram 23 as defined by the tracks 27 is ejected from the container 5 so as to empty the container 5 at the waste collection site. When container 5 is emptied of refuse material, the telescopic extension 25 is retracted, thus returning the ram 23 to its position
5 near the front wall 11 of the container 5.

Numerous modifications may be made to the embodiments as described above without departing from the scope of the invention, which is defined by the claims.

I claim:

1. A refuse collection system for use in combination with a transport vehicle, said system comprising:
 - a housing having a waste collection container and a tailgate whereby the tailgate has a front wall with an opening to the waste collection container;
 - a hopper in the tailgate with multiple compartments for receiving waste;
 - a packing mechanism suspended within the tailgate, said packing mechanism having multiple packer blades and a single shield for displacing refuse from the compartments of the hopper through the opening to the waste collection container.

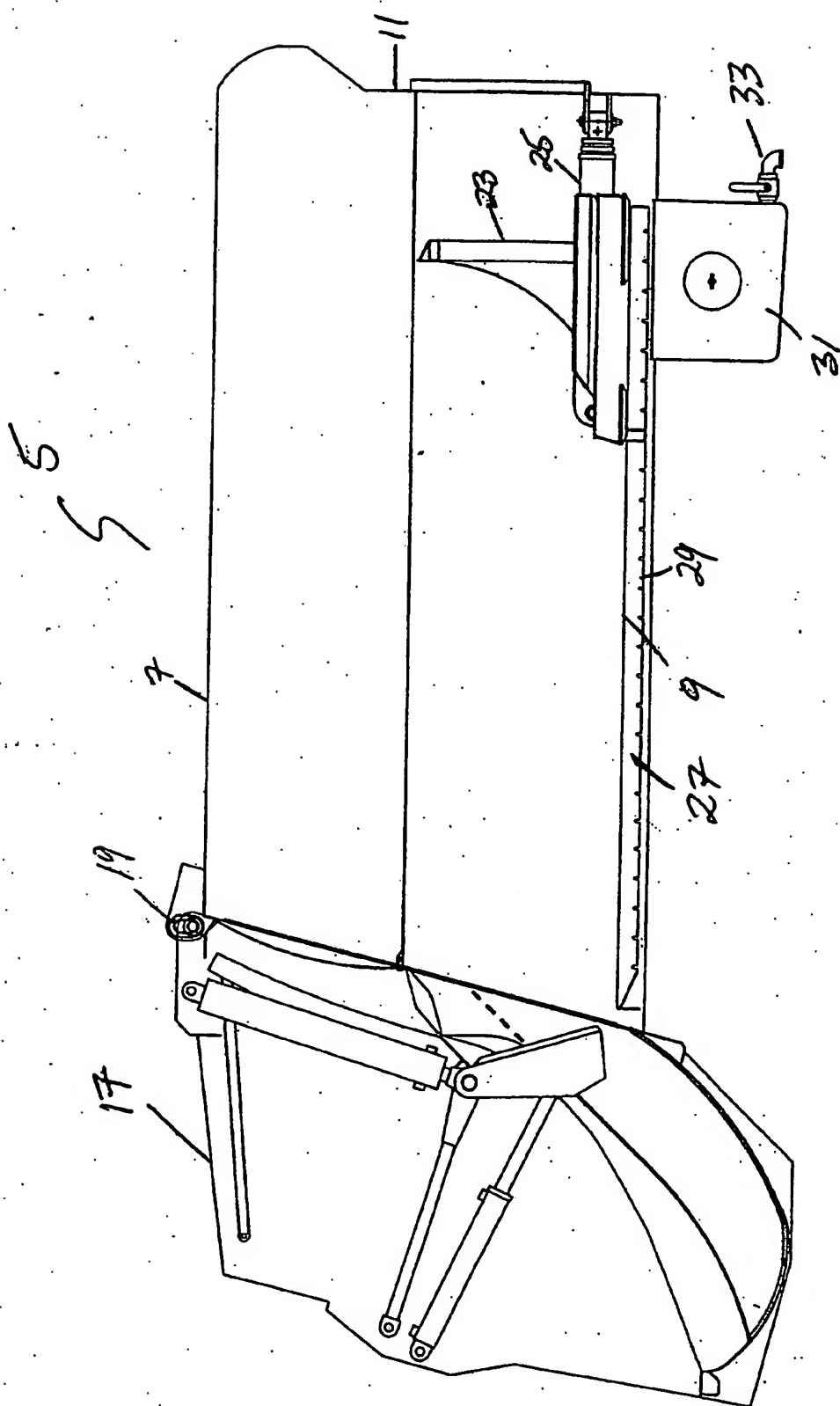


FIGURE 1

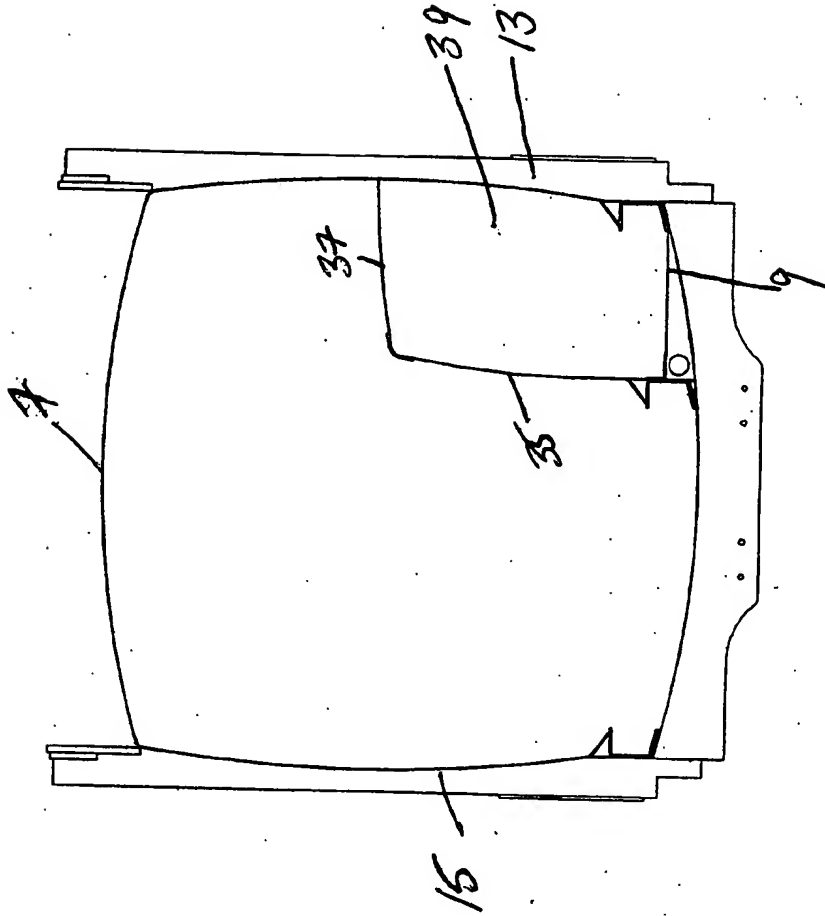


FIGURE 2

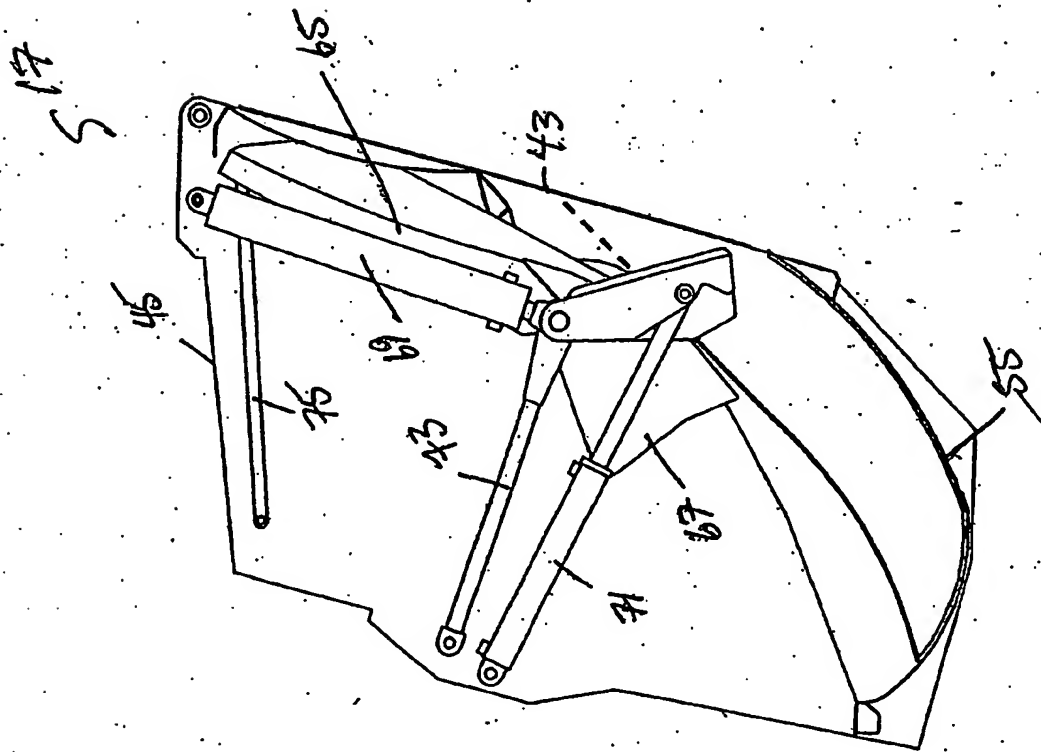


FIGURE 3

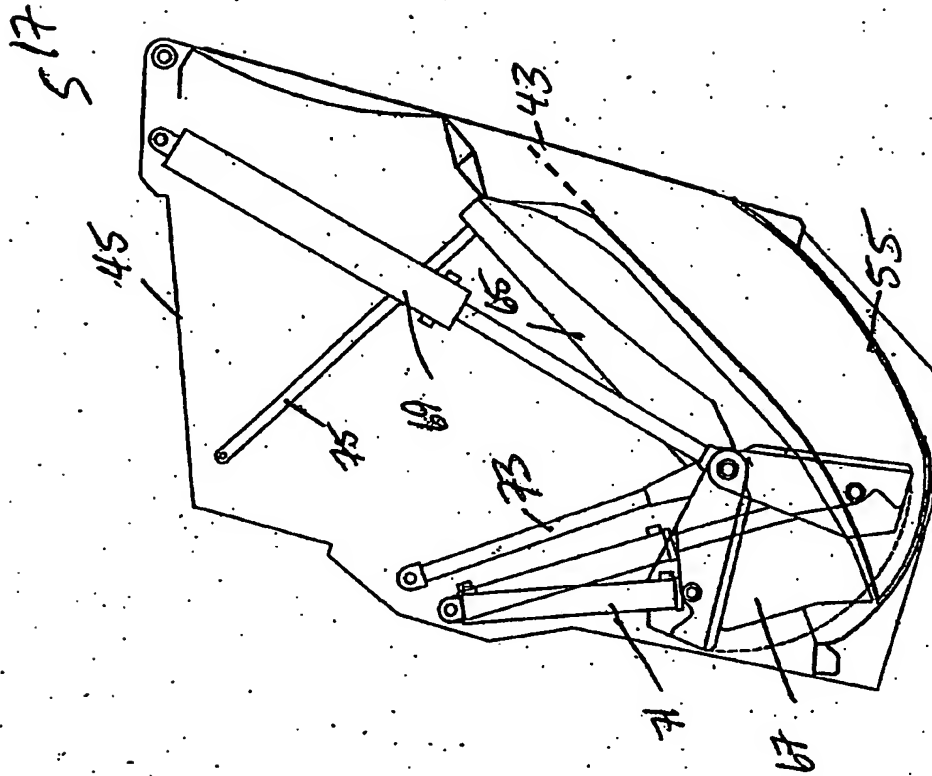
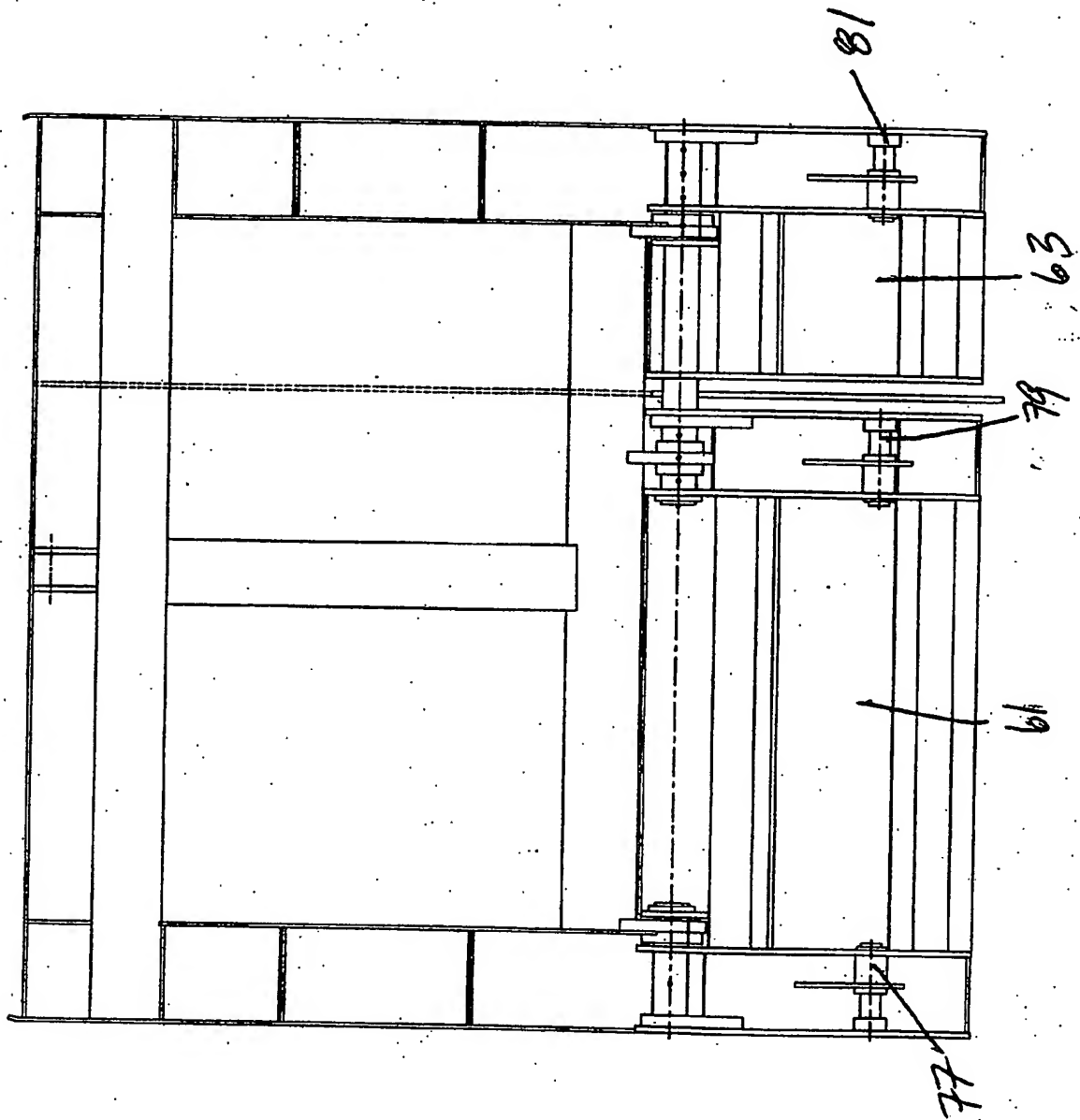


FIGURE 4



FIGURES